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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/545,165	08/11/2005	Kazushige Kojima	KOJIMA3	1534

1444 7590 03/09/2007

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EXAMINER	
GARRETT, DAWN L	
ART UNIT	**PAPER NUMBER**
1774	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/545,165	KOJIMA ET AL.	
	Examiner	Art Unit	
	Dawn Garrett	1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 August 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6-16-06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This application is a 371 of PCT/JP04/01447. The preliminary amendment was entered and claims 1-19 are pending.

Claim Objections

2. Claims 1 and 3-19 are objected to because of the following informalities:

a. The numbers (such as "(20)") following the various components in claims 1 and 3-19 are unnecessary and should be deleted.

b. It is suggested that "hole- and electron-transporting substances" be changed to "hole-transporting and electron-transporting substances" in claim 1 to make it clear that the hole transporting compound is a separate and distinct compound from the electron transporting compound.

c. Claim 8 contains a square symbol instead of a degree symbol in the last line of the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 9, 15, 17, and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 9, 15, 17, and 19 recite "said hole injection layer (30) consisting of a copper phthalocyanine". The claims are indefinite, because the claims upon which they depend do not

set forth a "hole injection layer" or further that a hole injection layer comprises copper phthalocyanine. Furthermore, the method limitations regarding the copper phthalocyanine included in the claim are unclear since the hole injection layer limitation is unclear. More specifically, it is unclear which materials result in the claimed diffraction peaks.

Claim Rejections - 35 USC § 103

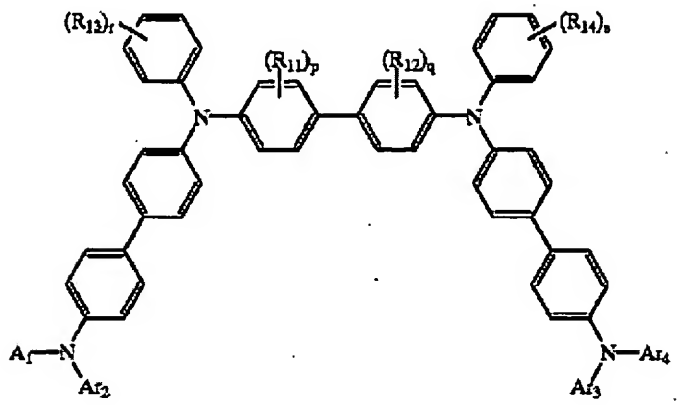
5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-7, 10-13, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobori et al. (US 6,285,039 B1) in view of Satsuki et al. (US 2005/0275341 A1). Kobori et al. teaches light emitting layers having a mixture of hole transporting material, electron transporting material and light emitting dopant (see col. 5, lines 34-67).

Kobori et al. teaches hole transporting compounds according to the following formula (see col. 5, lines 1-23):

(II)



wherein each of Ar_1, Ar_2, Ar_3, and Ar_4 is an aryl group, at least one of Ar_1 to Ar_4 is a polycyclic aryl group derived from a fused ring or ring cluster having at least two benzene rings; each of R_{11} and R_{12} is an alkyl group; each of p and q is 0 or an integer of 1 to 4; each of R_{13} and R_{14} is an aryl group; and each of r and s is 0 or an integer of 1 to 5.

For the electron transporting agent, Kobori et al. teaches compounds such as anthracene may be used (see col. 22, lines 53-54).

As the light emitting dopant, Kobori et al. generally teaches coumarin derivatives (see col. 4, lines 3-27), but fails to teach specifically a coumarin derivative having a glass transition temperature over 150 degrees Celsius. Satsuki et al. teaches, in analogous art, coumarin compounds for an electroluminescent device including formula 22 with regard to the claim 2 Formula 1, formula 62 (see page 12) with regard to the claim 2 Formula 2, and formula 21 with regard to the claim 2 Formula 3. It would have been obvious to one of ordinary skill in the art at the time of the invention to have selected one of the coumarin derivatives taught by Satsuki et al. as the coumarin derivative for the Kobori et al. device, because Kobori et al. teaches coumarin derivatives are suitable.

Kobori et al. further teaches a hole transporting layer and an electron transporting layer are included in the device (see col. 20, lines 25-27). With regard to claims 3-5 and 10-12, it would be obvious to select the same hole transporting material used in the mixed luminescent layer for the hole transporting layer and the same electron transporting material used in the mixed luminescent layer, because the same materials would be capable of performing the same desired transporting functions in both layers.

With regard to claims 6, 7, 13, 16, and 18 the ratio of electron transporting compound to hole transporting compound in the mixed luminescent layer is 1/99 to 99/1, which includes the amounts set forth in claims 6, 7, 13, 16, and 18 (see col. 24, lines 39-46).

7. Claims 8 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobori et al. (US 6,285,039 B1) in view of Satsuki et al. (US 2005/0275341 A1) in further view of Inoue et al. (US 5,635,308). Kobori et al. teaches light emitting layers having a mixture of hole transporting material, electron transporting material and light emitting dopant (see col. 5, lines 34-67).

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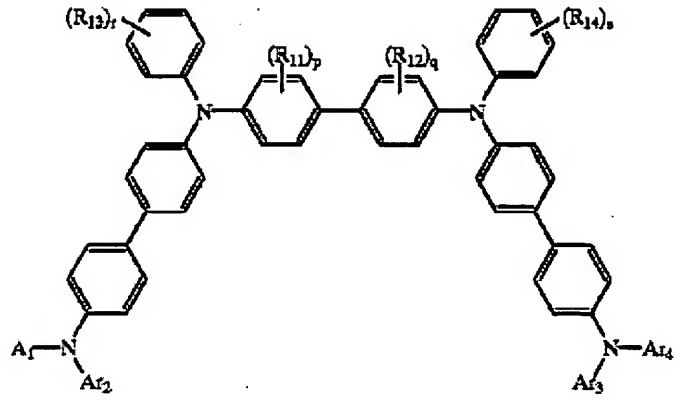
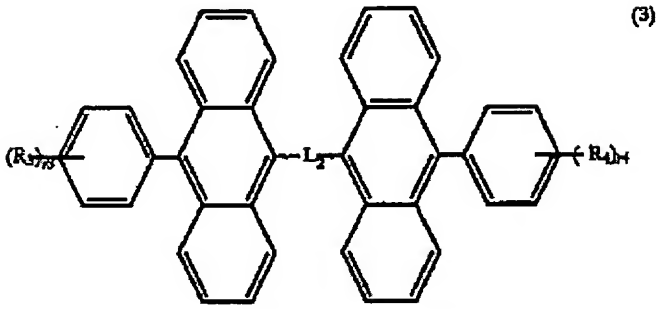


wherein each of Ar_1, Ar_2, Ar_3, and Ar_4 is an aryl group, at least one of Ar_1 to Ar_4 is a polycyclic aryl group derived from a fused ring or ring cluster having at least two benzene rings; each of R_{11} and R_{12} is an alkyl group; each of p and q is 0 or an integer of 1 to 4; each of R_{13} and R_{14} is an aryl group; and each of r and s is 0 or an integer of 1 to 5.

The formula taught by Kobori et al. is known in the art to have a glass transition temperature as required by the claims. For the electron transporting agent, Kobori et al. teaches compounds such as anthracene may be used (see col. 22, lines 53-54); however, Kobori et al. appears to be silent with respect to a specific anthracene compound having a glass transition temperature as set forth in the claims. Inoue et al. teaches in analogous art a phenylanthracene derivative that has an electron transporting property (see col. 3, lines 37-39) and is used as a major component (host) for a light emitting layer (see col. 3, lines 24-31):



wherein each of R_3 and R_4, which may be identical or different, is selected from the group consisting of an alkyl, cycloalkyl, aryl, alkenyl, alkoxy, aryloxy, amino and heterocyclic group, each of r3 and r4 is 0 or an integer of 1 to 5, and L_2 is a valence bond or an arylene group which may have an intervening group in the form of an alkylene group, —O—, —S— or —NR— wherein R is an alkyl or aryl group. Where r3 is an integer of 2 to 5, the R_3 groups may be identical or different or the R_3 groups, taken together, may form a ring. Where r4 is an integer of 2 to 5, the R_4 groups may be identical or different or the R_4 groups, taken together, may form a ring.

The compound taught by Inoue et al. is known in the art to have the required glass transition temperature. It would have been obvious to one of ordinary skill in the art at the time of the invention to have selected a phenylanthracene compound taught by Inoue et al. as a material with electron transporting properties for use in a luminescent layer for the electron transporting compound of the Kobori et al. device, because Kobori et al. teaches compounds such as anthracene compounds are desirable as the electron transporting material of the luminescent layer.

8. Claims 9, 15, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobori et al. (US 6,285,039 B1) in view of Satsuki et al. (US 2005/0275341 A1) in further view of Van Slyke et al., Appl. Phys. Lett., 69 (15), (1996), p. 2160-2162. Kobori et al. teaches a light emitting device, but fails to teach a hole injecting layer comprising copper phthalocyanine. Van Slyke teaches in analogous art the improvement in stability in a device by adding CuPc

(copper phthalocyanine) as a hole injection contact layer (see abstract and Fig. 1, page 2160). It would have been obvious to one of ordinary skill in the art to have formed a device comprising a CuPc hole injection layer, because one would expect such a layer to provide the benefit of improved hole mobility and device stability.

9. Claims 1-7, 10-13, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobori et al. (US 6,285,039 B1) in view of Fujiwara et al. (Journal of Photopolymer Science and Technology, Vol. 15, No. 2 (2002), p. 237-238). Kobori et al. teaches light emitting layers having a mixture of hole transporting material, electron transporting material and light emitting dopant (see col. 5, lines 34-67).

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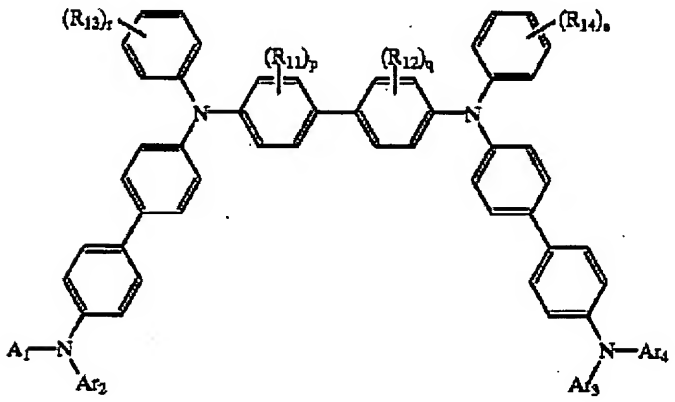

wherein each of Ar_1, Ar_2, Ar_3, and Ar_4 is an aryl group, at least one of Ar_1 to Ar_4 is a polycyclic aryl group derived from a fused ring or ring cluster having at least two benzene rings; each of R_{11} and R_{12} is an alkyl group; each of p and q is 0 or an integer of 1 to 4; each of R_{13} and R_{14} is an aryl group; and each of r and s is 0 or an integer of 1 to 5.

For the electron transporting agent, Kobori et al. teaches compounds such as anthracene may be used (see col. 22, lines 53-54).

As the light emitting dopant, Kobori et al. generally teaches coumarin derivatives (see col. 4, lines 3-27), but fails to teach specifically a coumarin derivative having a glass transition temperature over 150 degrees Celsius. Fujiwara et al. teaches in analogous art coumarin compounds for an electroluminescent device including formula(s) according to compounds of claim 2 (see Fujiwara et al. Table 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to have selected one of the coumarin derivatives taught by Fujiwara et al. as the coumarin derivative for the Kobori et al. device, because Kobori et al. teaches coumarin derivatives are suitable for the luminescent layer.

Kobori et al. further teaches a hole transporting layer and an electron transporting layer are included in the device (see col. 20, lines 25-27). With regard to claims 3-5 and 10-12, it would be obvious to select the same hole transporting material used in the mixed luminescent layer for the hole transporting layer and the same electron transporting material used in the mixed luminescent layer, because the same material would be capable of performing the same desired transporting functions in both layers.

With regard to claims 6, 7, 13, 16, and 18 the ratio of electron transporting compound to hole transporting compound in the Kobori et al. mixed luminescent layer is 1/99 to 99/1, which includes the amounts set forth in claims 6, 7, 13, 16, and 18 (see col. 24, lines 39-46).

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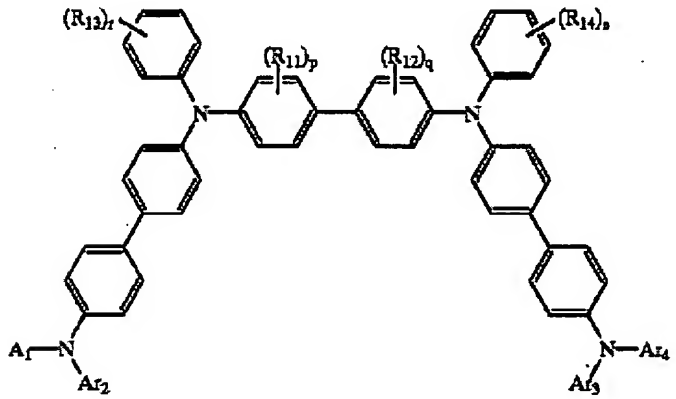

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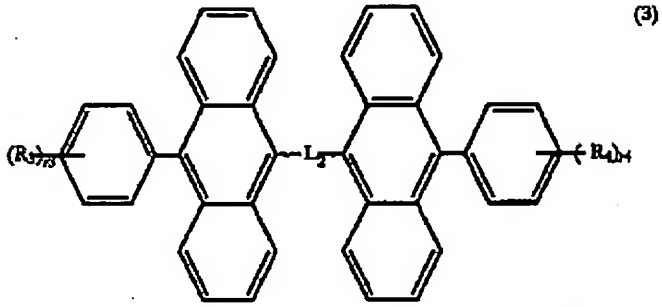

(3)

wherein each of R_3 and R_4, which may be identical or different, is selected from the group consisting of an alkyl, cycloalkyl, aryl, alkenyl, alkoxy, aryloxy, amino and heterocyclic group, each of r3 and r4 is 0 or an integer of 1 to 5, and L_2 is a valence bond or an arylene group which may have an intervening group in the form of an alkylene group, —O—, —S— or —NR— wherein R is an alkyl or aryl group. Where r3 is an integer of 2 to 5, the R_3 groups may be identical or different or the R_3 groups, taken together, may form a ring. Where r4 is an integer of 2 to 5, the R_4 groups may be identical or different or the R_4 groups, taken together, may form a ring.

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art the improvement in stability in a device by adding CuPc (copper phthalocyanine) as a hole injection contact layer (see abstract and Fig. 1, page 2160). It would have been obvious to one of ordinary skill in the art to have formed a device comprising a CuPc hole injection layer, because one would expect such a layer to provide the benefit of improved hole mobility and device stability.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 2005/0064237 is not prior art, but is provided to show evidence of the inherent glass transition temperatures of hole transporting tertiary amine compound(s) disclosed by Kobori and the electron transporting phenylanthracene compound disclosed by Inoue et al. (see particularly compounds 3, 7, and 8, and the Tables showing glass transition temperatures).

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dawn Garrett whose telephone number is (571) 272-1523. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on (571) 272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Dawn Garrett
Primary Examiner
Art Unit 1774

March 6, 2007